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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/050,797  | 01/18/2002  | Kazuichi Isaka       | 111697              | 9586             |
| 25944   | 7590        | 12/29/2004           | EXAMINER            |                  |
| OLIFF & BERRIDGE, PLC<br>P.O. BOX 19928<br>ALEXANDRIA, VA 22320 |             |                      | NAFF, DAVID M       |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 1651                |                  |

DATE MAILED: 12/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

## Application No.

10/050,797

## Applicant(s)

ISAKA ET AL.

## Examiner

David M. Naff

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 8/30/04 & 9/27/04.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 9-11, 13, 15, 17, 19, 21, 23 and 25-27 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 9-11, 13, 15, 17, 19, 21, 23 & 25-27 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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**DETAILED ACTION**

An amendment of 8/30/04 canceled claims 2, 6, 12, 14, 16, 18, 20, 22 and 24, amended claims 9, 10 and 23, and added new claims 25-27.

A supplemental amendment of 9/27/04 amended claims 9, 10 and 23.

5        Claims examined on the merits are 9-11, 13, 15, 17, 19, 21, 23 and 25-27, which are all claims in the application.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

***Specification***

10        The disclosure is objected to because of the following informalities: at page 5, line 19 of the specification, "ethylenoxy" appears to be a misspelling, and should be "ethyleneoxy". In all instances where occurring, the spelling of "ethylenoxy" should be changed to --- ethyleneoxy ---.

15        Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

Claims 10, 13, 17, 21, 23, 26 and 27 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which  
20 was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification fails to contain adequate support for the  
25 hydrophilic group being a "single type" of hydrophilic group and the

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hydrophobic group being a "single type" of hydrophobic group as now claimed in claims 10 and 23, and where recited in any other claims. While a polymer of a working embodiment contains only ethyleneoxy (hydrophilic) and propyleneoxy (hydrophobic) groups, this supports only these specific groups and the specific prepolymer or polymer containing these groups, and does not support the much broader concept claimed of any prepolymer or polymer containing any single type of hydrophilic group and any single type of hydrophobic group. This inventive concept was not in the specification as originally filed, and is not adequately supported by the description of a specific prepolymer and resultant polymer containing a specific hydrophilic group and a specific hydrophobic group in a working embodiment.

***Claim Rejections - 35 USC § 112***

Claims 10, 13, 17, 21, 23, 26 and 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 10 and 23 and where recited in any other claims, "single type of hydrophilic group" and "single type of hydrophobic group" are uncertain as to meaning and scope. A group that is a "type" of hydrophilic or hydrophobic group is relative and subjective, and will depend on individual interpretation. The term "single type" does not limit the claims to only a single specific hydrophilic group and hydrophobic group as in a described working embodiment in the specification. The term can encompass multiple hydrophilic groups and

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multiple hydrophobic groups since the term "type" can encompass a group of hydrophilic groups or a group of hydrophobic groups having a common similar characteristic that is considered to limit the group to being a "type". It would be uncertain as to the line of demarcation between being a single type of hydrophilic or hydrophobic group and not being a single type of hydrophilic or hydrophobic group.

***Claim Rejections - 35 USC § 103***

Claims 10, 13, 17, 21, 23, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sumino et al (6,576,451 B1).

Claims 10 and 26 are drawn to a method of producing a microorganism-immobilized carrier for removing an exogenous endocrine-disrupting chemical in water by mixing microorganisms and a pre-polymer having a single type of hydrophilic group and a single type of hydrophobic group mixed in its molecule in a ratio of hydrophilic group to hydrophobic group of 99:1 to 30:70, and polymerizing the pre-polymer to form the microorganism-immobilized carrier containing the microorganisms inclusively immobilized. Also claimed is the resultant microorganism-immobilized carrier (claims 13), and methods (claims 17, 21, 23 and 27) of removing an exogenous endocrine-disrupting chemical in water by bringing the water into contact with the microorganism-immobilized carrier.

Sumino et al disclose mixing a microorganism with an oligomer and polymerizing the oligomer to form a gel that inclusively entraps the microorganism (col 3, lines 17-20, col 5, lines 56-61 and col 8, line 2). The gel containing the entrapped microorganism is used in

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decomposing endocrine disrupter related compounds (col 1, lines 54-60) such as bisphenol A (paragraph bridging cols 7 and 8, and col 8, lines 35-43). The gel containing the microorganism is put in a reaction vessel (col 9, line 15 and col 10, line 31), and waste water containing an endocrine disrupter related compound is contacted with the gel. The oligomer contains a main structure with polymeric double bonds at both ends, and a sub-structure arranged between the main structure and the polymeric double bonds containing a urethane bond and an ethyleneoxy, or a urethane bond and an ethyleneoxy and a propyleneoxy (col 2, lines 16-23). The urethane bond has hydrophobicity and results in a gel that is flexible and has increased strength and erosion resistance (col 4, lines 37-43). The main structure is composed of a polyalkylene glycol that is a block copolymer formed by co-polymerizing a hydrophilic ethyleneoxy monomer with a hydrophobic propyleneoxy monomer (col 4, lines 25-30). The ratio of propyleneoxy is smaller than that of ethyleneoxy (col 4, lines 54-56). The ethyleneoxy has affinity for the microorganism (col 4, lines 15-17).

When not desiring the function of the hydrophobic urethane bond contained by the oligomer of Sumino et al, it would have been obvious to omit the urethane bond and use an oligomer containing only an ethyleneoxy hydrophilic group and a propyleneoxy hydrophobic group. The omission of a component along with its expected function merely because the component and its function are not desired or needed is obvious. It has not been established by evidence that the present

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invention can omit the hydrophobic urethane bond of Sumino et al and still obtain a gel that has the flexibility and increased strength and erosion resistance disclosed by Sumino et al as resulting from the urethane bond. With the exception of the claims requiring a single type of hydrophilic group and a single type of hydrophobic group, the claimed polymerizing of an oligomer in the presence of a microorganism as disclosed by Sumino et al results in a method of producing a microorganism-immobilized carrier as presently claimed for removing an exogenous endocrine-disrupting chemical. The oligomer and resultant polymer of Sumino et al will inherently have a ratio of hydrophilic group to hydrophobic group as claimed. Removing bisphenol A from waste water with the gel in a reaction vessel as disclosed by Sumino et al is a method that is the same as required by claims 17, 21, 23 and 27 when the urethane bond is omitted from the oligomer.

#### ***Response to Arguments***

Applicants urge that by the claims requiring a pre-polymer and polymer having a single type of hydrophilic group and a single type of hydrophobic group, the claims require different methods and product than disclosed by Sumino et al. However, as set forth above, it would have been obvious to omit the urethane bond from the oligomer of Sumino et al if the function of the urethane bond is not needed or desired. It is clear from Sumino et al that the oligomer will function for immobilizing a microorganism as disclosed by Sumino et al without the urethane bond since insertion of the urethane bond in the oligomer is considered by Sumino et al to be a improvement to obtain

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flexibility and increased strength and erosion resistance. If one does not want the improvement, omitting the urethane bond is clearly obvious.

***Claim Rejections - 35 USC § 103***

5        Claims 9, 11, 15, 19, 23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sumino et al in view of Gutttag (3,860,490).

10        The present claims differ from claims 10, 13, 17, 21, 23, 26 and 27 by requiring producing the microorganism-immobilized carrier by mixing the microorganism with a hydrophilic prepolymer containing a hydrophilic group and a hydrophobic prepolymer containing a hydrophobic group, and polymerizing.

15        Sumino et al is described above. Additionally, Sumino et al disclose a comparative example (col 9, lines 60-64) using a conventional ethyleneoxy oligomer which is a derivative of polyethylene glycol containing an acryloyl group or a metacryloyl group on each end.

20        Gutttag disclose immobilizing a microorganism by polymerizing a mixture containing monomers and the microorganism (col 5, lines 50-60). Monomers present may be hydrophilic monomers (paragraph bridging cols 2 and 3) and monomers which are hydrophobic (col 3, lines 34-36) to produce a copolymer containing the microorganism entrapped therein.

25        When carrying out the comparative example of Sumino et al, it would have been obvious to co-polymerize the polyethylene glycol derivative which is hydrophilic with a polypropylene glycol derivative

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containing an acryloyl group or a metacryloyl group on each end which is hydrophobic to prevent the microorganism from decomposing a gel made of only the polyethylene glycol derivative as suggested by Sumino et al disclosing forming a block copolymer of hydrophilic ethyleneoxy and hydrophobic propyleneoxy to prevent the microorganism from decomposing the gel when only ethyleneoxy is present (col 4, lines 15-22), and as suggested by Gutttag disclosing polymerizing a mixture containing a hydrophilic monomer, a hydrophobic monomer and a microorganism to produce a copolymer entrapping a microorganism.

Omitting the urethane bond disclosed by Sumino et al would have been obvious for reasons set forth above. Since Sumino et al suggest that the amount of propyleneoxy should be less than the amount of ethyleneoxy (col 4, lines 54-56), it would have been obvious to use an amount of hydrophobic pre-polymer within the range of claim 9. Sumino et al use the entrapped microorganism from the comparative example in the same way as the entrapped microorganism from polymerizing the oligomer of the invention, and when carrying out the modification set forth above, it would have been obvious to use the entrapped microorganism to remove an exogenous endocrine-disrupting chemical from water as in present claims 15, 19 and 23.

#### ***Response to Arguments***

It is granted as urged by applicants that Sumino et al does not disclose the claimed method of immobilizing by mixing hydrophilic and hydrophobic pre-polymers and a microorganism and polymerizing.

However, when Gutttag is considered in combination with Sumino et al,

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the claimed method of polymerizing hydrophilic and hydrophobic pre-polymers in the presence of a microorganism would have been an obvious way of immobilizing to provide the hydrophobic group desired by Sumino et al to prevent the microorganism from decomposing a gel made from only a hydrophilic monomer.

While Gutttag may not disclose hydrophilic and hydrophobic pre-polymers as urged by applicants, Gutttag suggests co-polymerizing hydrophilic and hydrophobic monomers to produce a copolymer entrapping a microorganism, and the monomers are inherently pre-polymers since they are monomers that precede formation of the co-polymer. The term pre-polymer encompasses monomers used to form a polymer. As to motivation that applicants urge is lacking, motivation is to provide the hydrophobic group disclosed by Sumino et al to prevent the microorganism from decomposing a gel made of only a hydrophilic monomer.

### **Conclusion**

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX  
5 MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David M. Naff whose telephone number is 571-272-0920. The examiner can normally be reached on Monday-Friday 9:30-6:00.

10 If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Wityshyn can be reached on 571-272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David M. Naff  
Primary Examiner  
Art Unit 1651

DMN

12/23/04